

# Indian Agriculture Towards 2030—Need for a Transformative Vision



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## 1 Background

The historical experience of almost all economies shows that the share of the agriculture and allied sectors in total employment as well as in their national income falls with progress in economic development. This decline does not, however, diminish the need to address various challenges confronting the agriculture sector, which is a core concern in both developed and developing countries. Agriculture, after all, provides food for the very survival of human life. More importantly, this dependence goes beyond mere survival to adequate nutrition for an active and healthy life. The other significance of agriculture is its role in supporting and improving rural livelihoods. The kind of agriculture practised determines the maintenance of the agro-ecological balance, biodiversity, sustainable use of land, water and other natural resources, apart from ensuring social security. Agriculture also supplies the raw material that is the foundation for economic activities ranging from industrial production to trade and commerce. Agriculture is both a victim of and contributor to climate change and, therefore, it must adapt to the consequences of this change and reduce its own emissions of greenhouse gases. The challenges and opportunities of the agriculture sector are dynamic; some are common for all countries while some are country specific.

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## 2 Global Challenges

Eliminating hunger and poverty has remained on the global development agenda for a long time and several initiatives have been taken to address them. The most recent attempts include the Sustainable Development Goals (SDGs) 2030, which were preceded by the Millennium Development Goals (MDGs). The SDGs 2030 provide a very valuable benchmark to address issues like hunger, poverty, nutrition, sustainability, climate change and inclusive development. Most of these goals are directly or indirectly related to agriculture.

Despite a sizeable increase in the per capita production of food and ample grain production, hunger and malnutrition are far from being eradicated. There is evidence to show that the world is not on track to achieve the SDG 2.1 Zero Hunger target by 2030.<sup>1</sup>

About 2 billion people are reported to lack regular access to sufficient, safe and nutritious food. Indeed, there are reports of increase in hunger and malnutrition in recent years. Nutrition is not just about having adequate dietary energy intake (the indicator of hunger and undernutrition used by the Food and Agriculture Organisation (FAO) and other agencies of the United Nations); with rising awareness and level of economic development, the emphasis is shifting to “balanced and adequate nutrition”. This shift is an important factor for changes in dietary preference, though several other causes like changing lifestyles and consumer preferences, also have a role to play. This dietary diversification, in turn, requires widespread changes in the structure of production—which is overwhelmingly focussed on staple foods—to include more of fruits, vegetables, livestock products and fish. Thus, there is a need for production diversification to match the diet diversity.

The use of agro-chemicals in agri-food production in the pre- and post-harvest stages of plant food, animal food and seafood has risen significantly. At the same time, there is also a strong public perception that the increasing use of chemicals in food production, storage, preservation, etc. is a key reason for many diseases and health hazards in humans. The estimates show that about US\$110 billion is lost each year in low- and middle-income countries due to productivity loss and medical expenses resulting from unsafe food.<sup>2</sup> As a result, the demand for safe food is getting stronger.

Agriculture is the biggest user of water and land. Their injudicious use for agricultural production affects the environment and natural resources to a significant extent. According to the Organisation for Economic Cooperation and Development (OECD), irrigation in the agriculture sector accounts for 70% of water use worldwide. In the case of India, the share of agriculture in total water use is estimated at 80–90%. While a large section of the population does not have access to adequate water, this precious resource is used very inefficiently in farming activities. Agriculture also contributes significantly to the depletion of groundwater and rising stress on water resources. Improvement in the availability of water for human

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<sup>1</sup> <http://www.fao.org/publications/sofi/2020/en/>.

<sup>2</sup> <https://www.who.int/news-room/fact-sheets/detail/food-safety>.

and non-agriculture uses, addressing water stress in rainfed and dryland agriculture and ensuring sustainable use necessitates the efficient and judicious use of water in agriculture.

Modern agriculture has progressed through specialisations and monoculture farming. This has reduced crop/seed and breed diversity and has also adversely affected overall biodiversity. These are still the order of the day, despite strong recommendations for cropping system and farming system approaches in production. FAO's report on *State of the World's Biodiversity for Food and Agriculture* points to the fact that many key components of biodiversity for food and agriculture at the genetic, species and ecosystem levels are in decline.<sup>3</sup> There is a need to internalise the ecological benefits of the farming system approach to balance the economic benefits of specialisation.

Agriculture is the principal source of livelihood in most of the developing countries and is dominated by smallholders. These farmers suffer from disadvantage of scale as well as weak institutional support and market access. The present state of industrial technology is highly labour displacing and has lowered the prospects of absorption of labour in industry and, consequently, the chances of shift of labour from agriculture to non-agriculture, which is what the standard economic development approach maintains. The challenge today is to create remunerative jobs in and around agriculture which are at par with jobs in the urban and industrial sectors.

### 3 Challenges at the National Level

Some of these global challenges are exacerbated in the case of India. The agriculture sector continues to constitute a significant portion of the Indian economy with a 17.7% share in gross value added as of 2019–20 and 44% share in the total workforce.<sup>4</sup> The sector is also crucial to attaining the SDGs, not only to address hunger and nutrition but also as a significant determinant of natural resource sustainability, GHG emissions and environment quality.

During the last three decades, agricultural output has grown at a trend growth rate of 3% per year while population has grown at 1.6% (Chand, 2017). Furthermore, while agri-food production has maintained almost the same growth rate over this period, population growth has decelerated to an estimated 1.1%. India exports more than 7% of the food it produces. The country also accumulates a huge stock of staple food, 40% of which is distributed to two-thirds of the population at highly subsidised prices. Yet India is home to the largest number of undernourished people in the world. This calls for new insights into the causes of hunger and undernutrition, as a significant number of people consume less than the normative level of diet despite the availability of food as well as adequate purchasing power.

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<sup>3</sup> <http://www.fao.org/state-of-biodiversity-for-food-agriculture/en/>.

<sup>4</sup> Agriculture refers to crops, livestock, fishery and forestry.

The acceleration in the growth of food production will undoubtedly help the Indian economy, but there are several challenges that need to be tackled. India is now surplus in many commodities and needs foreign markets to sell this surplus in order to prevent a fall in prices received by farmers. The growth rate in agriculture so far has been largely driven by output price support and input subsidies. These cause serious distortions in output markets and have led to the unsustainable use of natural resources.

There are reports of farmers not getting remunerative prices for some crops as markets are not very competitive. Efficiency in production needs to improve, as does logistics. Land lease laws in the country neither allow the expansion of operational holdings nor do they encourage exit from farming.

In India, 60% of the land area is under agriculture. There are reports of land degradation because of intensive cultivation, certain agricultural practices and use of agro-chemicals like inorganic fertilisers and herbicides.

The already serious stress on India's water resources is worsening with each passing year. The groundwater level is falling at an alarming rate in large parts of the country (at least half the observation wells in the country) and 600 million people already face high to extreme water stress. Despite the rising gap between the demand and supply of water, India's policies and practices encourage the profligate use of water. The agriculture sector uses 80–90% of total water used in the country and, yet, half of the area under agriculture remains rainfed. India uses far more water than many major agricultural countries to produce the same quantity of output. The reason for this is that farmers follow flood irrigation, as both water supply to agriculture as well as power supply to extract groundwater for irrigation is either free or highly subsidised.

In most of the crops, increase in productivity has been accompanied by an increase in average cost of production, which necessitates an increase in output prices to keep incremental production profitable. There is a need for a shift in strategy from 'growth' to 'efficient growth', such that any increase in productivity is associated with a reduction in the average cost of production. This requires upgradation of agricultural technology, application of modern skills to farm practices, new innovation in farming and lowering wastages in the use of fertilisers, water and other inputs.

## **4 India's Commitments to SDGs and Climate Change**

The SDGs—which number 17—were adopted by all United Nations Member States in 2015 as a universal call to change the world for the better by 2030. The Government of India has appointed NITI Aayog as the nodal institution for coordinating all the SDG efforts at the national and sub-national levels. Given the federal structure of the country, and the division of powers and responsibilities between the Central and state governments, states have a leading role to play in the achievement of the SDGs at the national level. The approach of cooperative and competitive federalism has resulted in the formulation of the SDG India Index, which is the world's first

government-led sub-national measure of SDG progress. A dashboard with interactive visualisation, has been developed and is in the public domain.<sup>5</sup> The first edition of the Index was launched in December 2018, the second edition in December 2019 and the third edition in January 2021. The Index is designed to function as a tool for focussed policy dialogue, formulation and implementation of policy and moving towards development action pegged to globally recognisable metrics. It also highlights crucial gaps related to monitoring SDGs and the need for improving statistical systems at the national, state and union territory levels.

NITI Aayog presented India's second Voluntary National Review (VNR) at the United Nations High-level Political Forum on Sustainable Development, 2020. India's VNR has undergone a paradigm shift in terms of embodying a "whole-of-society" approach in letter and spirit. NITI Aayog engaged with sub-national and local governments, civil society organisations (CSOs), local communities and the private sector during the VNR preparation process. As part of this process, NITI Aayog partnered with the UN in India and CSOs to curate a consultative process, which saw more than 50 national and sub-national consultations with over 1000 CSOs from 14 population groups. In line with the theme of "Taking SDGs from Global to Local", the goal-wise account of progress on the SDGs has been emphasised with a range of diverse good practices and success stories of interventions from the states.

Climate change is now recognised as a reality and is no longer treated as a fanciful obsession of environmentalists. It has been included in the SDGs. The international community has committed to "take urgent action to combat climate change and its impacts". SDG 13 calls for strengthening resilience and adaptive capacity to climate related hazards and natural disasters. More than 191 countries have ratified the 2016 Paris Agreement after the Conference of the Parties (COP). Parties have agreed to report regularly on their emissions and on their implementation efforts to contain or reduce emissions. India ratified the Paris Agreement on 2 October 2016. India's Nationally Determined Contribution (NDC) targets<sup>6</sup> are three:

1. to lower the emissions intensity of gross domestic product (GDP) by 33–35% over 2005 levels by 2030. This does not restrict India's option to chase higher growth, but it calls for lower emission per unit of output.
2. to increase the share of non-fossil-based energy to 40% of the total energy mix. Households and agriculture are the best candidates for this. In agriculture, solar energy can be used to power pump sets rather than diesel. Ethanol use can also be encouraged.
3. to create an additional (cumulative) carbon sink of 2.5–3 billion tonne of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030. This cannot happen only on forest land. There is need to promote agro-forestry on private lands.
4. Agriculture has an important role to play in each of the three targets, as it affects climate change and also gets affected by it. The country needs more food by

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<sup>5</sup> <https://sdgindiaindex.niti.gov.in/#/>.

<sup>6</sup> <https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>.

2030, the cultivation of which requires more water, energy and land. Food has to be grown in a more hostile environment. The challenge is to produce the same or more quantity of food with lower emissions, by changing the practices and methods of production, as well as geographies. India emitted 2299 million tonnes of carbon dioxide (CO<sub>2</sub>) in 2018. It accounts for 7% of global GHG emissions. Agriculture and livestock account for 18% of gross national emissions.

What is required is sustainable agriculture that involves simultaneous increase in production and income, adaptation to climate change and reduction in GHG emissions, while balancing crop, livestock, fisheries and agro-forestry systems, increasing resource use efficiency (including land and water), protecting the environment and maintaining ecosystem services. Alternative agricultural practices, suitable in different regions, can reduce net GHG emissions while maintaining or improving yields and adapting to more extreme weather. It is necessary to seize every opportunity available in technology, policy, institutions and community action to shift from inefficient farm practices towards long-term sustainability, efficiency and resilience in order to successfully adapt to climate change.

## 5 Need for a Transformative Vision

Despite myriad challenges, Indian agriculture offers substantial opportunities to contribute to economic growth, eliminate—or at least reduce dramatically—hunger and malnutrition, improve sustainability of resource use and reduce environmental footprints by aligning the crop production strategy to the natural resource endowments and enhance inclusivity. The agri-food system is undergoing some changes, but the speed of this change is much slower than what is required for achieving the SDGs, especially those related to land, water, environment and climate change. The change is also necessitated by changes on the demand side and the need to meet the goal of adequate nutrition. The pace of this change depends largely on technology and policies related to food production, marketing, distribution, public and private investments and awareness and motivation of various stakeholders.

Major changes will be witnessed in both the growth rate as well as the composition of food demand in the coming years. The most notable change will be in the per capita intake of cereals, which is showing a decline, in contrast to the rising per capita demand for horticultural crops and livestock products. This necessitates a fresh look at policies to improve food and nutrition security consistent with the shift in consumer preferences.

Considering the unprecedented challenges that agriculture is facing globally, especially in India, and the opportunities that exist, there is a need for a transformative vision for the next decade. Realising this need, a national dialogue was initiated to think through this transformation—what are its key elements and what

it means for policy and practice. The areas that need special attention were identified through a collaborative process between NITI Aayog, the Ministry of Agriculture and Farmers Welfare (MoA&FW) and the Food and Agriculture Organisation of the United Nations (FAO) under the overall guidance of a Steering Committee comprising agricultural experts.

These areas were grouped into eight themes: (a) structural reforms and governance; (b) pathways for profitable, sustainable and resilient agriculture; (c) nutritive and safe food; (d) climate crisis and risk management; (e) application of science, technology and innovation; (f) pests, pandemics, preparedness and biosecurity; (g) use of water in agriculture; and (h) alternative farming, agro-ecological and biodiverse futures. Eminent experts contributed papers in the specific thematic areas, which were discussed at a national conference during 19–22 January 2021.<sup>7</sup> These papers, which have incorporated many of the suggestions that were proffered during the conference, are presented in chapters that follow.

## Reference

Chand, R. (2017). *Doubling farmers income: Rationale, strategy, prospects and action plan*. NITI Aayog, Government of India.

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<sup>7</sup> The virtual conference was held on 19–22 January 2021: <http://www.fao.org/india/news/detail-events/en/c/1369694/>.